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TO: W. H. Loerpabel, Mgr.
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Tucson, Arizona

FROM: Harrison Schmitt

SUBJECT: Octave Mine, Octave, Arizona (second report)

In accordance with recent instructions from you, Mr. J. Pollock and I have made a further study of the Octave Mine, particularly the outcrop of the vein and walls and the area underground which appears to be critical in the ownership dispute now going on.

This last struck does not basically change my original outline of the geology as given in my first report. It strengthens most of the original generalization and adds to the detail.

The Octave vein is definitely a composite vein or lode. That is, it is made up of several mineralized fault strands separated by sheared and mineralized ground. The lode may average 30 ft. in thickness normal to the dip. A lode is defined by W. Lindgram.

"Mineral Deposits" 4th edition, 1933, McGraw-Hill Book Co., Inc. New York, N.Y. pp. 156-158

"Instead of a single break we may have a fracture consisting of a number of approximately parallel fissures, irregularly connected and spaced over a considerable width, which may attain 100 feet or even several hundred feet. These large fracture zones when filled with ore and partially replaced contry rock are called composite vein or lodes. The Comstock Lode in Nevada illustrates this occurrence; its width in places amounts to several hundred feet.

The walls at Octave are composed of old amphibolite schist and schistese quartzite

Hornstone?

and epicotic horstone cut by slightly schistose diorite. Pagmatite and aplite cut the diorite. All these rocks have been sheared and moderately altered by the lode faulting and shear and subsequent mineralization. The apparent faulting and horizontal shift of an identifiable zone of pegmaties and aplites indicates that the Octave lode is a reverse fault with a throw amounting to several hundred feet or more. The movement seems to have been from Northeast to Southwest. The lode measured about 50 ft. wide horizontally and has been followed and mapped for 2200 feet along the strike. It extends farther to the West and possibly farther to the East than has been mapped.

At most places the lode has a hanging wall and foot-wall band of quartz or gouge. In places, however, only one medial band of quartz may exist. However, between the bands and between the true walls and the bands there is usually sheared lode material with laminations parallel to the lode. This material when made from diorite is a chloritic schist. Other wall rocks may result in massive lode rocks in which even the wall rock assistosity may be preserved. The lode material as distinct from the quartz bands is altered mainly to chlorite but also to pink epidote, pyrite, quartz carbonate, and sericite.

The quartz bands or veins are largely quartz varing from a milky quartz to a gray quartz. The gray quartz is usually non-commercial. Gold, which is the chief metal, is associated with the sulphides, galena, pyrite, marcasite, sphalerite and chalcopyrite. The sulphides are in cracks in the quartz, usually cracks parallel to the quartz bands.

Study of the quartz bands indicates that the bands, morphologically, are better described as disks. The term disk is preferable to lens. The quartz of the disks overlaps, but only small areas of the stopes in the disks overlap. Probably the total area of the stope overlap, does not exceed several squares 100 feet on the side. The disks extend outward from stopes to the band to thin non-commercial quartz and finally to gouge seams. The quartz is apparently localized by the more important of the gouge seems. The lode sheer as seen, may in part be fractured cleavage. For some reason, the principal gouge seams are usually found near the walls of the lode. The gouge was apparently replaced by the quartz.

Recognition of the character of the disks and the fact that the ore seldom overlaps should be of value in exploration. The bottom of a disk would not necessarily be the bottom of the mine. Apparently raising and cross-cutting for a parallel vein should not be carried to excess and presumably should be done near the edge of a developed disk.

The conditions at the bottom of the Electric winze are more or less fully shown by the cross-sections and Map 0-39-No. 2. Two veins or gouge-filled fault fissures are always revealed by adequate prospecting. They are usually about 20 ft. apart.

The Joker fault, which cuts the area, is normal. The dip is 70 degrees Northeast. The Northeast wall is down 20 ft. where the fault cuts the 1250 shaft level. The result is that the hanging wall and foot-wall bands are placed opposite each other on the 1250' level. Previously this led some to the assumption that they were the same band.

Proof that the Joker fault is normal is shown by the drag on the 1250' and 1050 Joker shaft levels. The fault contains no post-fault quartz, only carbonate. When the limits of the lode are mapped, the proof of the faulted condition is still more emphatic.

The future of the mine, so far as the grade of ore now being produced, looks bright. It should be possible to find more disks or ore laterally and down the dip. I think there is little doubt that the East fault can be solved when this solution becomes important.

(Original signed) Harrison Schmitt

Astronaut

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